REMARKS

Reconsideration and withdrawal of the rejections of the claimed invention is respectfully requested in view of the amendments, remarks and enclosures herewith, which place the application in condition for allowance.

I. STATUS OF CLAIMS AND FORMAL MATTERS

Claims 1-17 are now pending in this application; claims 1-6 are under examination and claims 7-12 have been withdrawn from consideration. Support for the amendment to claim 2 can be found in the specification, e.g., paragraph [0026] of the publication of this application. New claim 13 represents claim 1 with the elements of claims 2-4 added and the additional elements with respect to degree of substitution described in paragraph [0022] in the publication of this application. New claim 14 further adds the element of purity also described in paragraph [0022]; for clarification, the applicants also refer to paragraph [0015], lines 23 -24 ("Consequently, the water insoluble cellulose becomes water-soluble and industrially available."). New claim 15 recites the wt. % ranges described in paragraph [0020] for alkyl halide. New claims 16 and 17 exemplify specific aspects of the Examples presented in the specification. No new matter has been added by this amendment.

It is submitted that the claims, herewith and as originally presented, are patentably distinct over the prior art cited in the Office Action, and that these claims were in full compliance with the requirements of 35 U.S.C. § 112. The amendments of the claims, as presented herein, are not made for purposes of patentability within the meaning of 35 U.S.C. §§§§ 101, 102, 103 or 112. Rather, these amendments and additions are made simply for clarification and to round out the scope of protection to which Applicants are entitled.

II. THE 35 U.S.C. 112, 2nd PARAGRAPH REJECTION HAS BEEN OVERCOME

Claims 5 and 6 were rejected as allegedly indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regards as the invention. The applicants request reconsideration of this rejection in light of the amendments made to claims 5 and 6; the text should provide further clarification that the applicants are referring to efficiency as related to degree of substitution (DS) in the cellulose which are well known measurements within the art.

III. THE 35 U.S.C. 102(b) REJECTION HAS BEEN OVERCOME

Claims 1-6 were rejected as allegedly being anticipated over Kim (KR 10-2003-0092006). The applicants request reconsideration of this rejection for the following reasons.

In order to establish anticipation, all elements of the applicants claimed invention must be taught by the cited reference. However, Kim does not meet this standard for anticipation.

The applicants' claimed method of preparing hydroxyalkylalkylcellulose comprises of two reactions which is summarized below:

(1) reacting alkali metal hydroxide with cellulose, agitating the mixture, adding **alkylene oxide and 20-95 wt% of alkyl halide** with reference to the total amount of alkyl halide added through the first and second reactions;

(2) alkali metal hydroxide to the cellulose, dispersing the mixture and then adding **5-80 wt% of alkyl halide** with reference to the total amount of alkyl halide added through the first and second reactions.

Therefore, the applicants' claimed method has two distinct process reaction steps wherein an amount of alkyl halide is reacted with the alkali metal hydroxide processed cellulose.

In contrast, after the first alkali metal hydroxide addition step in Kim, the **entire quantity of alkylene oxide** is added to the activated cellulose and then after the second alkali metal metal hydroxide addition step in Kim, the **entire quantity of alkyl halide** is added to the activated cellulose (see page 4, third paragraph and claim 1 from English translation of Kim – see also applicants' comments regarding Korean Patent No. 511087, which is the patent of the Kim application – KR 10-2003-0092006, in paragraph [0009] of the publication of the '331 application).

Since Kim has no teaching for the addition of alkyl halide in both reaction steps as described in the applicants' claimed method of preparing hydroxyalkylalkylcellulose, all elements of the invention have not been taught and therefore, the applicants' claims are not anticipated by Kim.

IV. THE 35 U.S.C. 103(a) REJECTION HAS BEEN OVERCOME

Claims 1-6 were rejected as allegedly being obvious over Dannhorn et al. (U.S. Patent Application Publication 2003-0065165 – "Dannhorn"). The applicants request reconsideration of this rejection for the following reasons.

Although there is some surface similarity between Dannhorn's and the applicants' claimed process because they are both directed to making hydroxyalkylalkyl celluloses, when considering the respective invention as a whole, it can be seen that the respective processes are different and represent unobvious variations of making hydroxyalkylalkyl celluloses.

A. One reaction vs. two reaction process

First, the applicants' process requires at least two distinct reaction steps whereas the process of Dannhorn's process has only one reaction step, see summary from Dannhorn's description of their process conditions for making hydroxyalkylalkyl celluloses below:

(a) 0.9 – 2.9 eq. of alkali metal hydroxide and suspension medium with at least 0.2 eq. of alkylating agent

(b) reacting the alkalized cellulose of step (a), which includes the at least 0.2 eq. of alkylating agent and a hydroxyalkylating agent at a temperature above 65°C

(c) adding additional alkali metal hydroxide

(d) adding additional alkylating agent in an amount at least the absolute value or the difference between (i) the number of eq. of alkylating agent already added (see step (b)) and (ii) the total number of equivalents of alkali metal hydroxide added (add total from steps (a) and (c))

- additional alkylating agent is not added if the amount already added exceeds the total amount of alkali metal hydroxide added.

These general reaction conditions were further described in Examples 7-12, 13-22, 31, 32, 33, 34 in Dannhorn which had the following common conditions:

- dimethyl ether and ("y" eq.) chloromethane (metered into the reactor)
- ("v" eq.) sodium hydroxide (addition and stirring for 60 minutes)
- (0.8 eq.) propylene oxide (addition, **heated to 85°C** and then stirred for 120/180 minutes)
- ("w" eq.) sodium hydroxide and ("z" eq.) chloromethane (addition at 85°C and then stirring for 120 minutes, **then cooled**)

The reaction occurs at these elevated temperatures and there is no indication of a second reaction step as in the applicants' claimed invention.

B. Sequence of process conditions is different

When comparing the process conditions of the applicants' invention as compared to the process conditions of the Dannhorn, it can be seen that the process conditions are not in the same sequence (see chart on following page):

Applicants' claim 1	**Process condition of Dannhorn (see Abstract) – summarized for readability**
1. A method of preparing hydroxyalkylalkylcellulose by reacting cellulose with an etherification agent, which comprises:	A process of preparing alkylhydroxyalkyl cellulose by reaction of cellulose in the presence of alkali metal hydroxide with an alkylating agent and a hydroxyalkylating agent…the process includes:
performing a first reaction by adding 0.5-4 moles of an alkali metal hydroxide per 1 mole of cellulose and agitating the mixture,	(a) alkalizing cellulose by means of 0.9 – 2.9 eq. of alkali metal hydroxide in the presence of a suspension medium with at least 0.2 eq. of alkylating agent
adding 0.5-3 moles of an alkylene oxide per 1 mole of the cellulose and adding 20-95 wt% of alkyl halide with reference to the total amount of alkyl halide added through the first and second reactions; and	
	(b) reacting the alkalized cellulose of step (a), which includes the at least 0.2 eq. of alkylating agent and a hydroxyalkylating agent at a temperature above 65ºC (c) adding additional alkali metal hydroxide (d) adding additional alkylating agent in an amount at least the absolute value or the difference between (i) the number of eq. of alkylating agent already added (see step (b)) and (ii) the total number of equivalents of alkali metal hydroxide added (add total from steps (a) and (c)) - additional alkylating agent is not added if the ***amount already added exceeds the total amount of alkali metal hydroxide added***.
performing a second reaction by adding 1-4 moles of an alkali metal hydroxide per 1 mole of the cellulose,	
dispersing the mixture and then adding 5-80 wt% of an alkyl halide with reference to the total amount of alkyl halide added through the first and second reactions.	

Although the applicants have already argued above that the processes are distinct because of the number of reaction steps, even if the distinction was only viewed as a difference in the rearrangement of process steps, the applicants have shown evidence of secondary considerations.

Whereas the process described by Dannhorn takes at least five hours plus additional process times (60 + 120 + 120 minutes – see Examples), the applicants' claimed process only

took 1 hour 40 minutes plus additional process times (1 hour + 10 min + 30 min – see paragraphs [0025] and [0026]), i.e. a decrease in reaction time of about 66%.

Also, whereas the process of Dannhorn resulted in a ***GREATER*** number of equivalents of alkylating agents used in the process than the number of equivalents of alkali (e.g. compare "y + z" or "y" alone (amount of alkylating agent added) vs. "v + w" (amount of alkali metal hydroxide added) in Tables 1-4 and 6-8 of Dannhorn.), the applicants' claimed process requires a ***LESSER*** number of equivalents of alkylating agent relative to the number of equivalents of alkali.[1] Not only is this a surprising result, but is a much more preferred outcome to one of ordinary skill in the art as alkali metal hydroxides are generally less expensive than alkyl halides, more environmentally friendly than alkyl halides and require less onerous handling techniques (e.g. use of caustic solution in applicants' process did not require a diluent gas or mixture with another gas as for methyl chloride).

In addition, whereas the applicants claimed process conditions produce remarkable uniformity with regard to degree of **methoxyl substitution (28.5 – 29.1%)**, degree of hydroxypropoxyl substitution (6.5 – 7.5%), methyl chloride efficiency (61.2 – 61.8%), propylene oxide efficiency (62.5 – 67.7%) and amount of water insoluble substances (0.011 – 0.018 wt. %) – see Examples 1- 8 in Table 2 of the specification, the process of Dannholm produced a greater degree of variability in their products, e.g.. Examples 8, 10 and 12 showed a degree of **methoxyl substitution of 1.45 – 1.78 (about 48% to 66%)**; Examples 15-22 showed a degree of hydroxypropoxyl substitution of 0.37 – 0.62 (about 12.3% to 20.7%) and Example showed sedimentation, i.e. much greater levels of water insoluble substances than in the applicants' claimed process.

C. Closing

As all of the applicants' claimed process elements are not taught or suggested by the cited reference or from knowledge available to those of skill in the art, the applicants' claims are unobvious over Dannholm. Moreover, the applicants have provided evidence of unexpected results and that the claimed process does produce a different hydroxyalkylalkyl cellulose than those taught by Dannholm, the applicants claims are also unobvious for these reasons as well. (Applicants also note that claims 13-17 are also unobvious in view of Dannholm)

CONCLUSION

In view of the remarks and amendments herewith, the application is believed to be in condition for allowance. Favorable reconsideration of the application and prompt issuance of a Notice of Allowance are earnestly solicited. The undersigned looks forward to hearing favorably from the Examiner at an early date, and, the Examiner is invited to telephonically contact the undersigned to advance prosecution. The Commission is authorized to charge any fee occasioned by this paper, or credit any overpayment of such fees, to Deposit Account No. 50-0320.

Respectfully submitted,
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[1] For example, in Table 1 of the applicants' specification, the total amount of methyl chloride (M.W. = 50.49) used in Example 1 was 6.1 kg (6100 g), i.e. **120.82 moles of methyl chloride**. The total amount of caustic (NaOH – M.W. 40.0) used was 10.0 kg (10,000 g), i.e. **250 moles of caustic**.